

Consolidated Edison Company of New York

Steam Operations Storm Hardening: Impacts and Solutions

Presented by:

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Agenda

- Presenter introductions
- Coastal storm impacts
 - New York City
 - Steam production facilities
 - Steam distribution system
- Storm hardening measures
 - Project goals
 - Production measures
 - Distribution measures

Presenter Introductions

Frank A. Cuomo, PE, PMP

- Section Manager – Steam Distribution Services
- Education
 - Manhattan College B.S. Mechanical Engineering



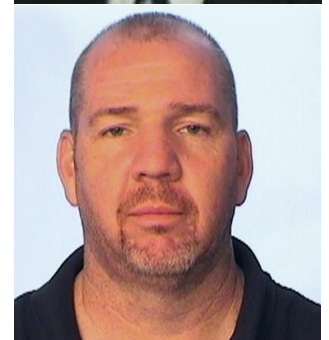
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- Project Manager – Steam Distribution
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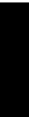
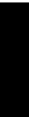
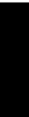
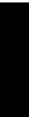
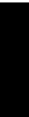
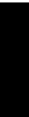
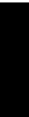
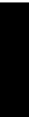
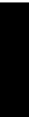
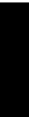
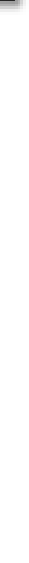
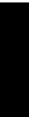
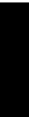
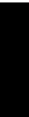
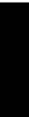
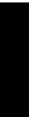
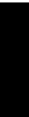
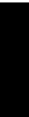
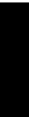
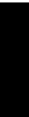
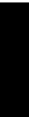
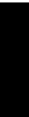
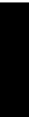
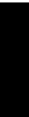
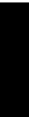
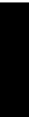
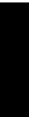
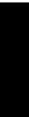
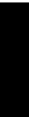
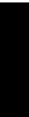
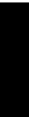
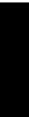
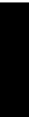
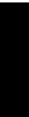
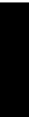
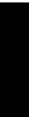
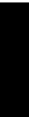
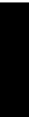
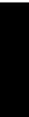
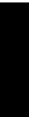
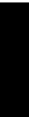
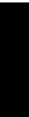
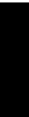
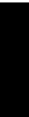
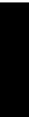
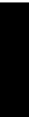
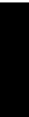
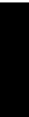
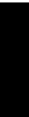
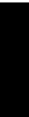
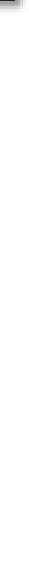
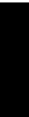
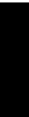
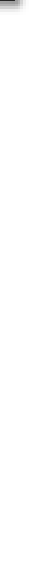
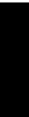
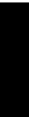
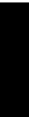
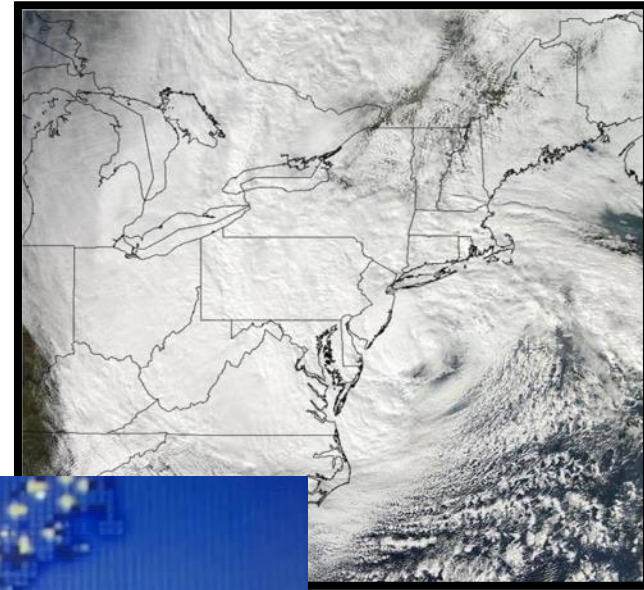


Joseph O'Hagan

- Project Manager – E 59th Street Station
- Education
 - Manhattan College B.S. Org. Mgmt.



New York City Coastal Storms



New York City Coastal Storms: Hurricane Sandy Preparation



New York City Coastal Storms: Hurricane Sandy



New York City Coastal Storms: Hurricane Sandy



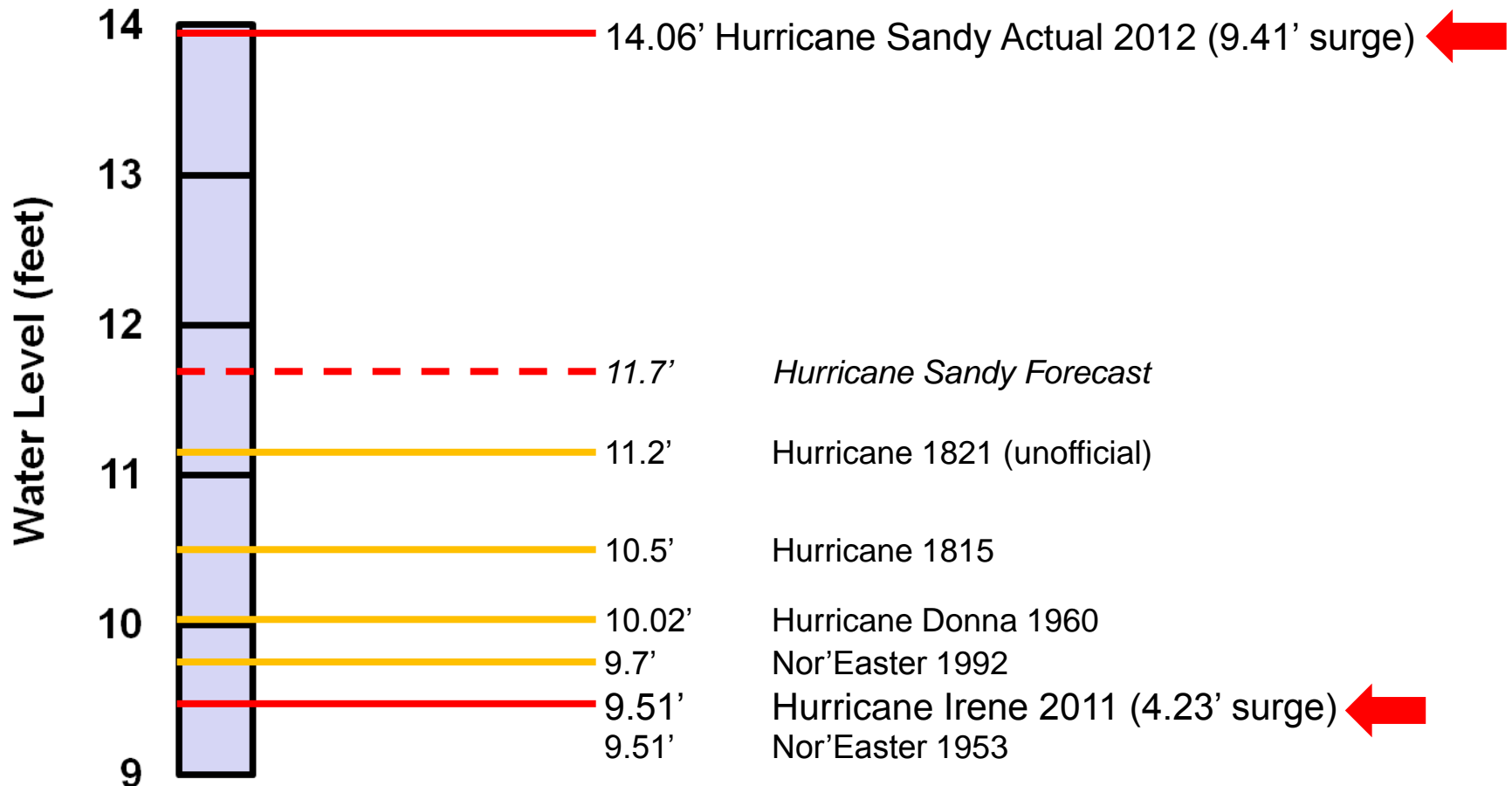
New York City Coastal Storms: Hurricane Sandy



New York City Coastal Storms: Hurricane Sandy



Historical Storm Tide Levels

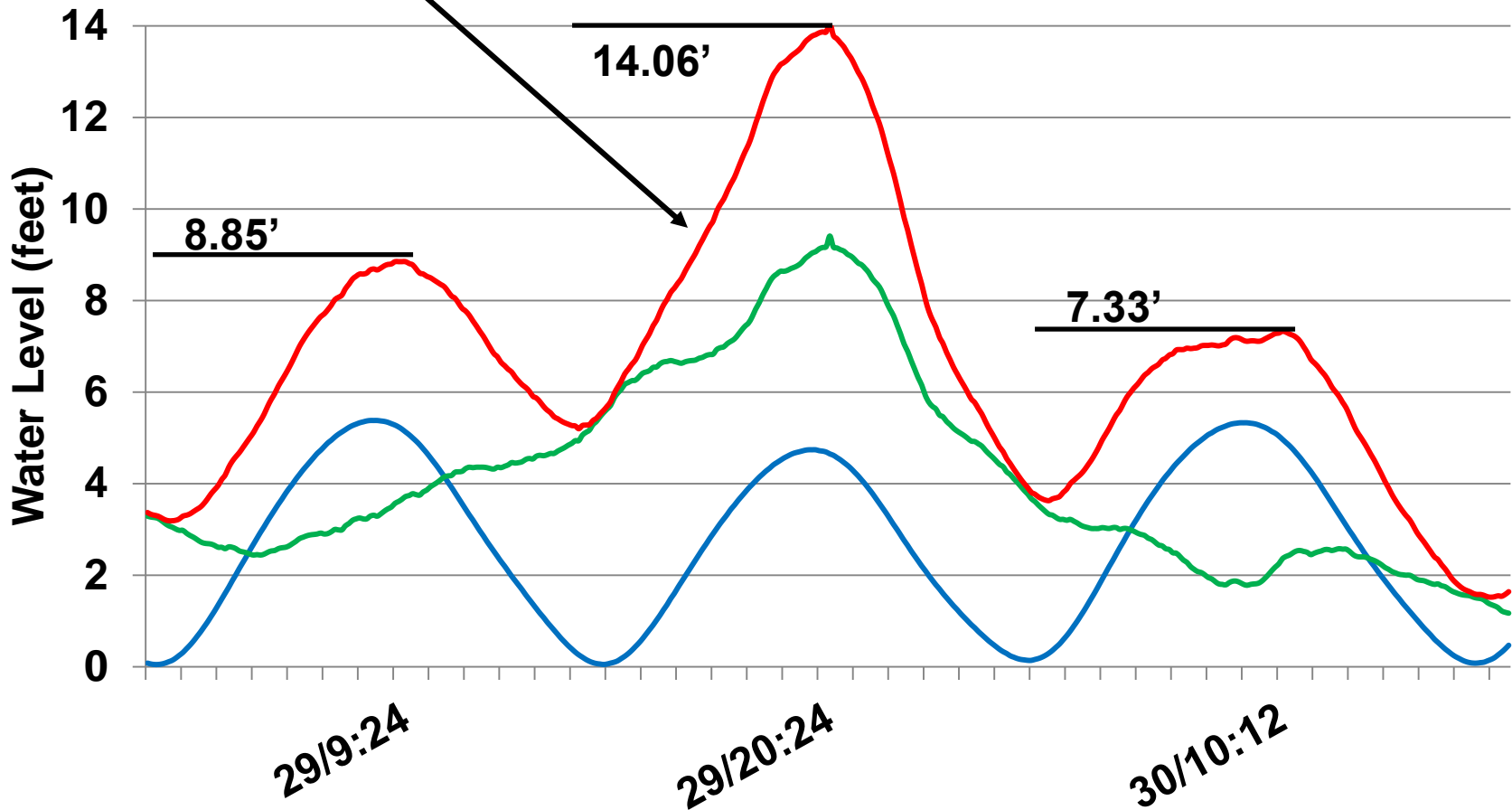


Hurricane Sandy Storm Surge

Storm Tide Levels

Rising 1-3" every 6 min.

— Tide — Surge — Observed (Tide + Surge)

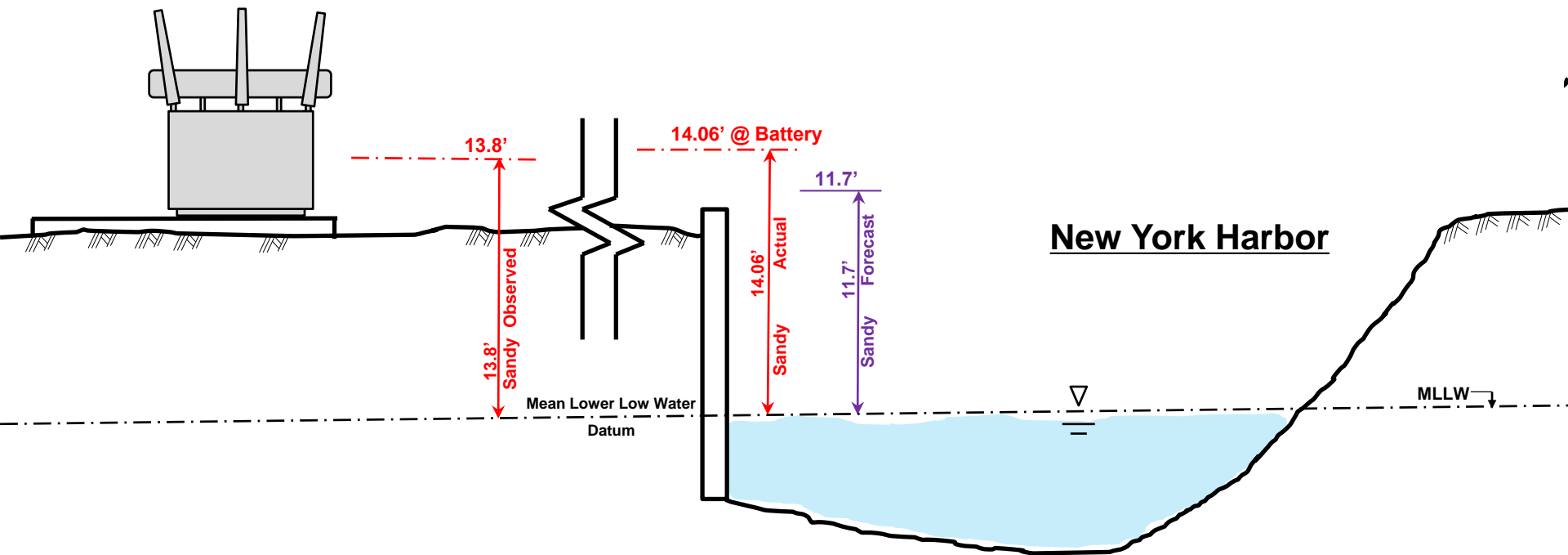


Hurricane Sandy Storm Surge

East 13th St /

East River Complex

Battery

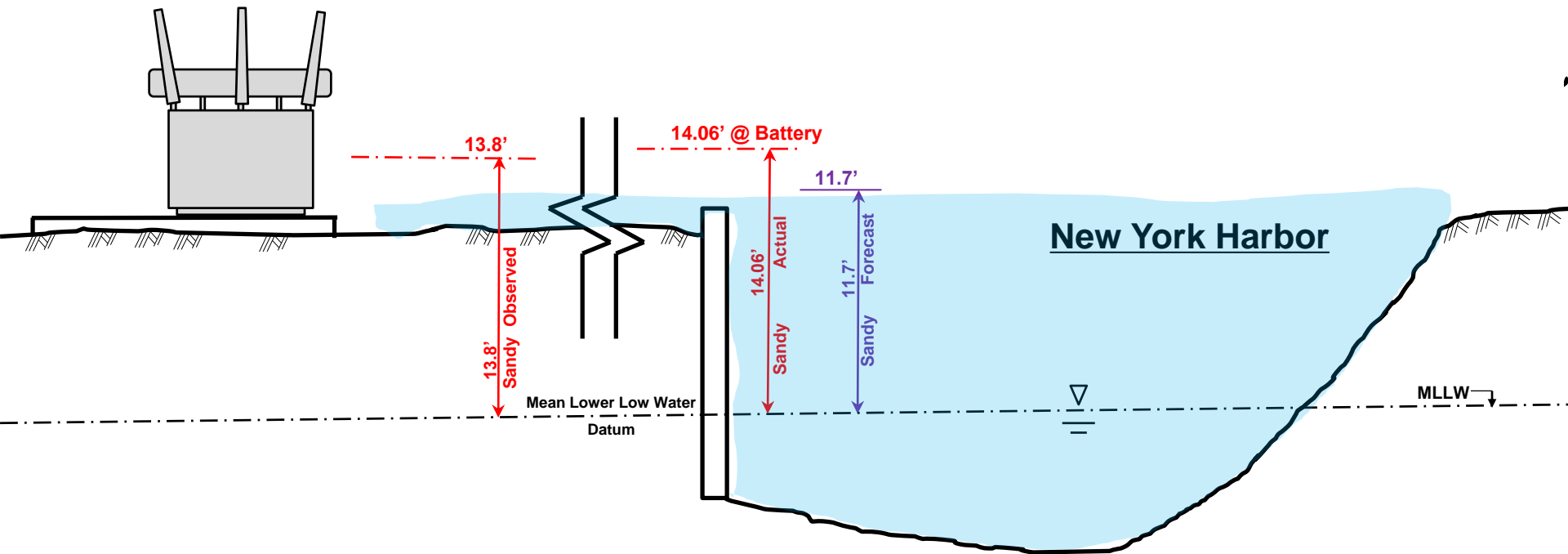


Hurricane Sandy Storm Surge

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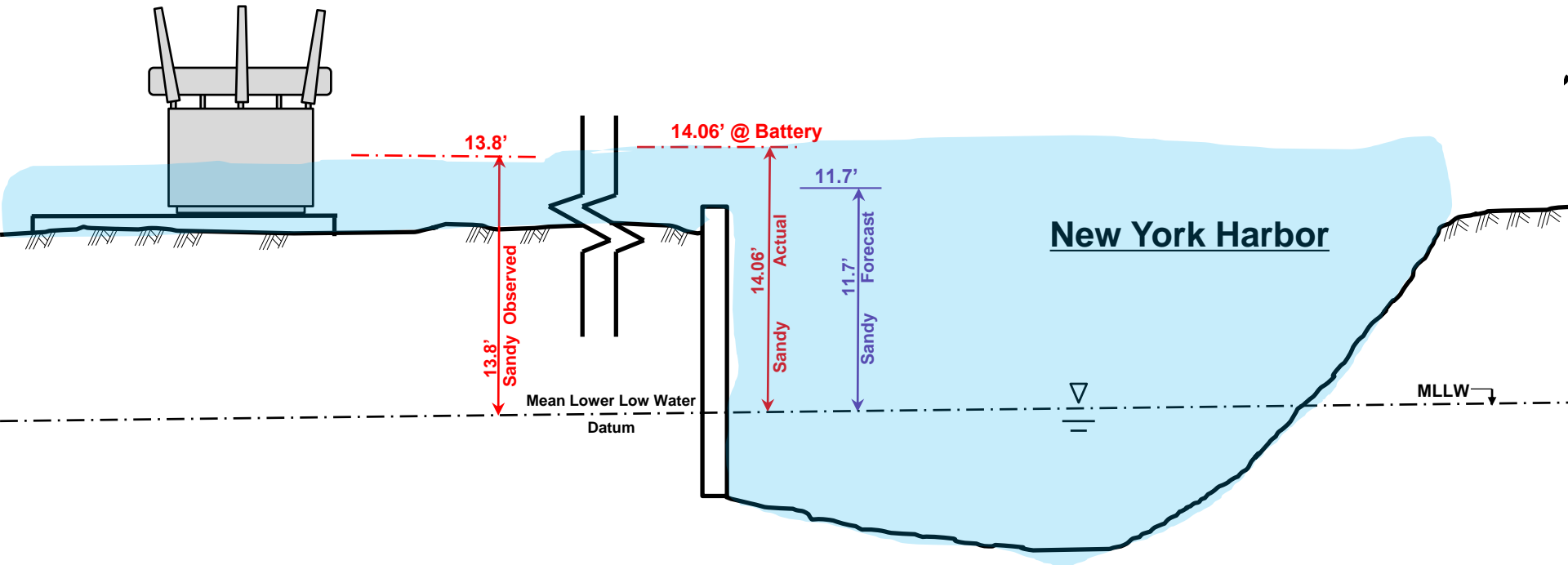


Hurricane Sandy Storm Surge

East 13th St /

East River Complex

Battery



New York City – Massive Power Outage



Steam Operations Impact

- Steam

- 561 services
 - 142 due to electric system issues in lower Manhattan
 - 53 due to availability of steam system capacity
 - 12 due to crane incident
- Approximately 30 miles of steam mains impacted



59th Street Station



74th Street Station



Ravenswood A House



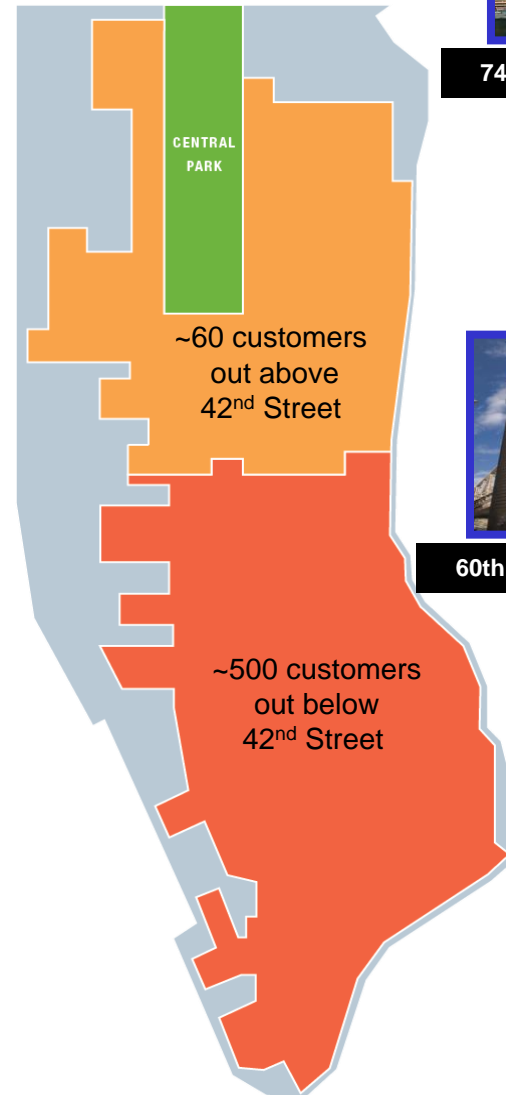
60th Street Station



East River Station



Brooklyn Navy Yard



Steam Operations Impact



59th Street Station



74th Street Station



Ravenswood A House



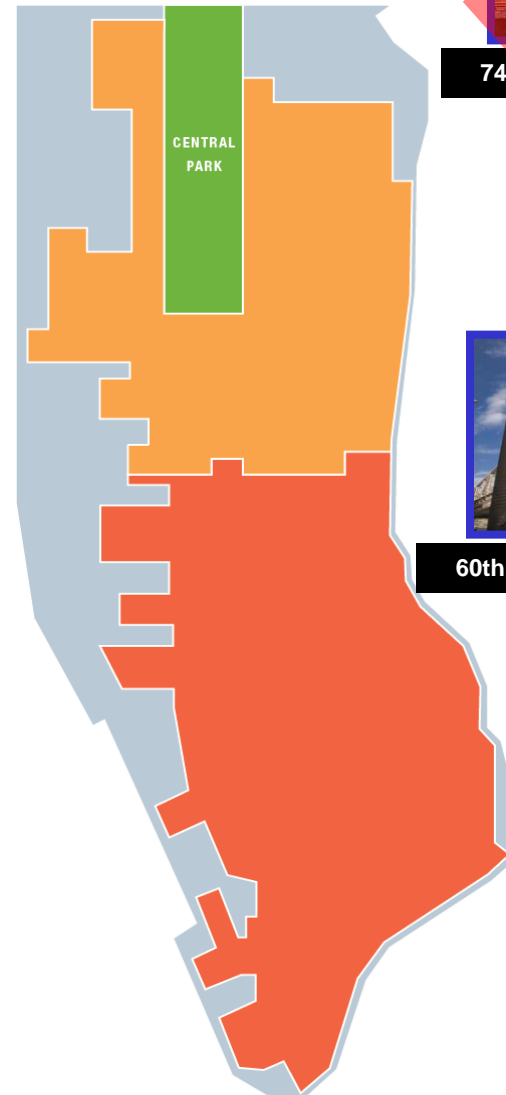
60th Street Station



East River Station



Brooklyn Navy Yard



- Major Issues

- Power Outages
- Production Issues
 - Plants out of service
- Distribution Issues
 - Downtown service
 - Valve locations
 - Failed valves

Steam Storm Hardening Program Production Measures

Level 1: Perimeter Protection

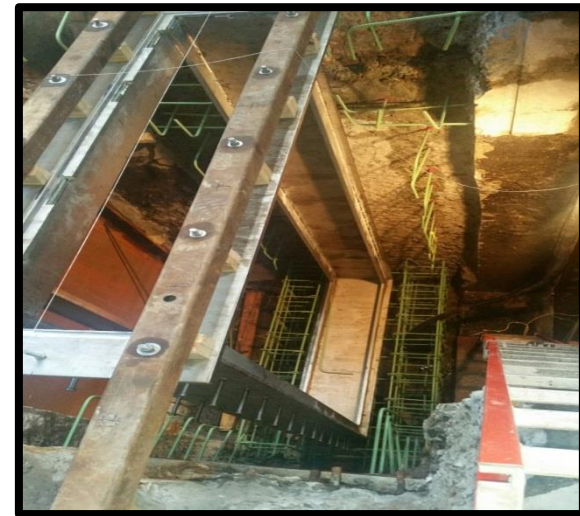
Tunnel Flood Protection: Frame Installation



Tunnel Flood Protection



Tunnel Project: Concrete Floor Removal



Flood Barriers



Level 2: Interior Protection

Concrete Flood Wall: Compartmentalizing Station



Walls & Doors



Level 3: Pumping Equipment

Submersible Pumps & Trash Pumps



Trash Pumps & Diesel Generator

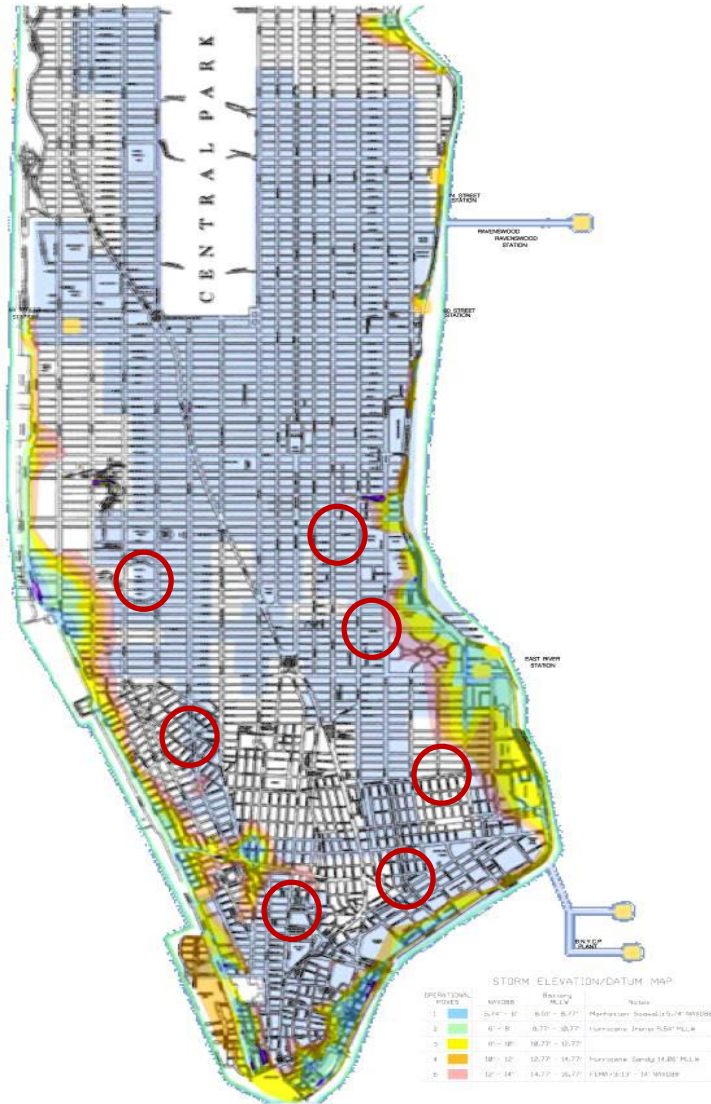


Trash Pumps



Steam Storm Hardening Program Distribution Measures

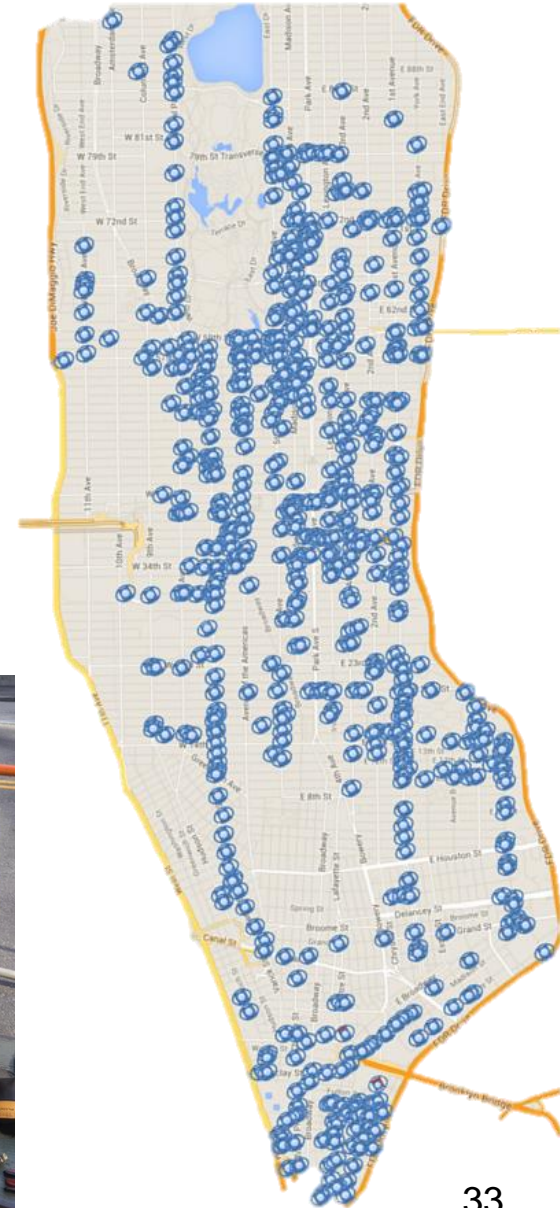
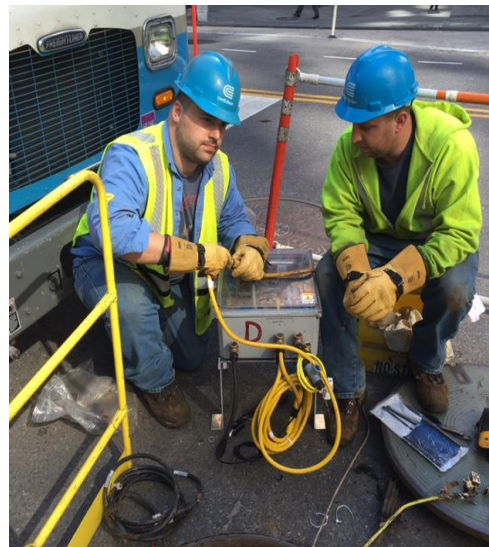
Steam Distribution Measures Overview



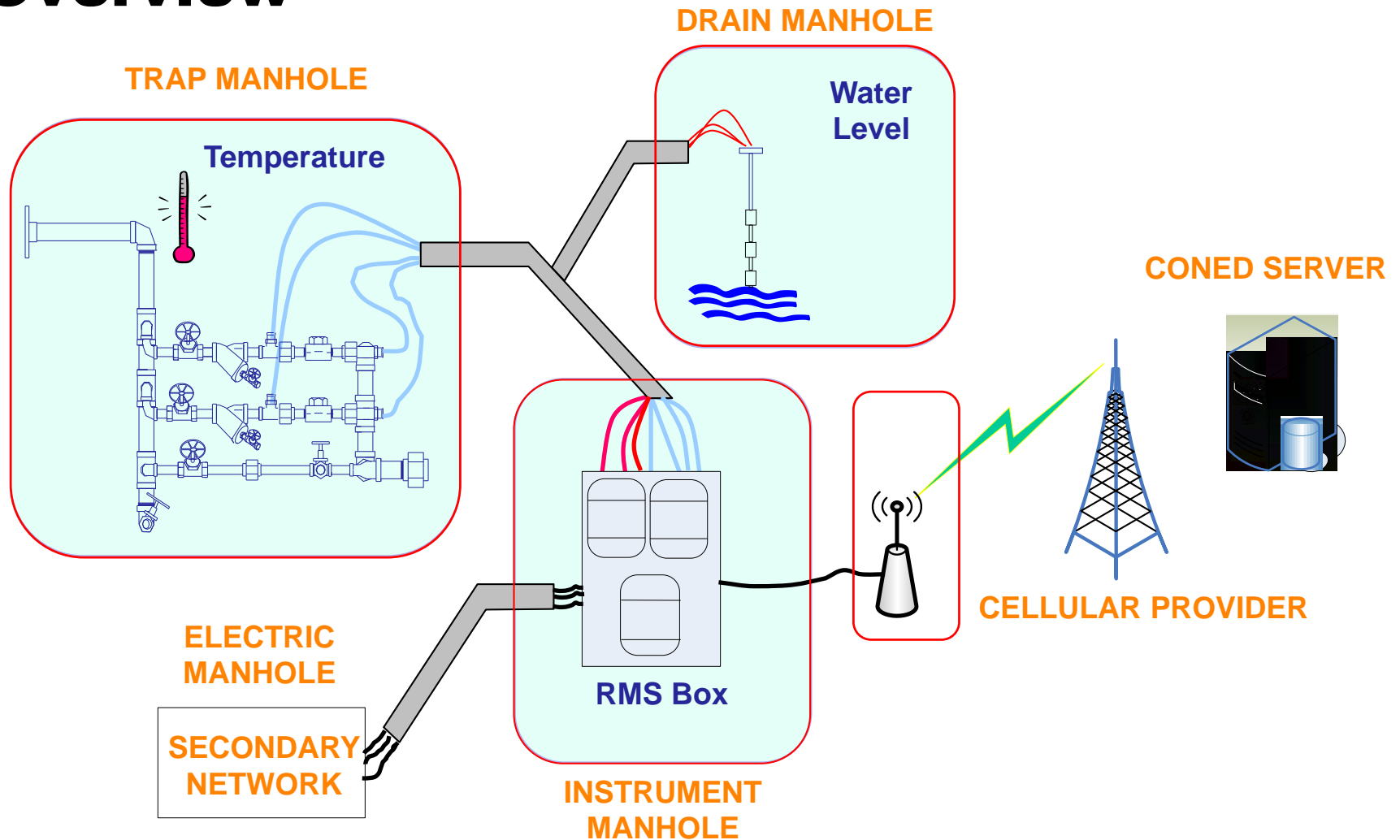
1. Remote Monitoring System Expansion
2. Public Health Corridor Tie
3. Distribution / Transmission Tie
4. Installation of Additional Main Valves
5. Installation of Remote Operated Valves

Remote Monitoring System

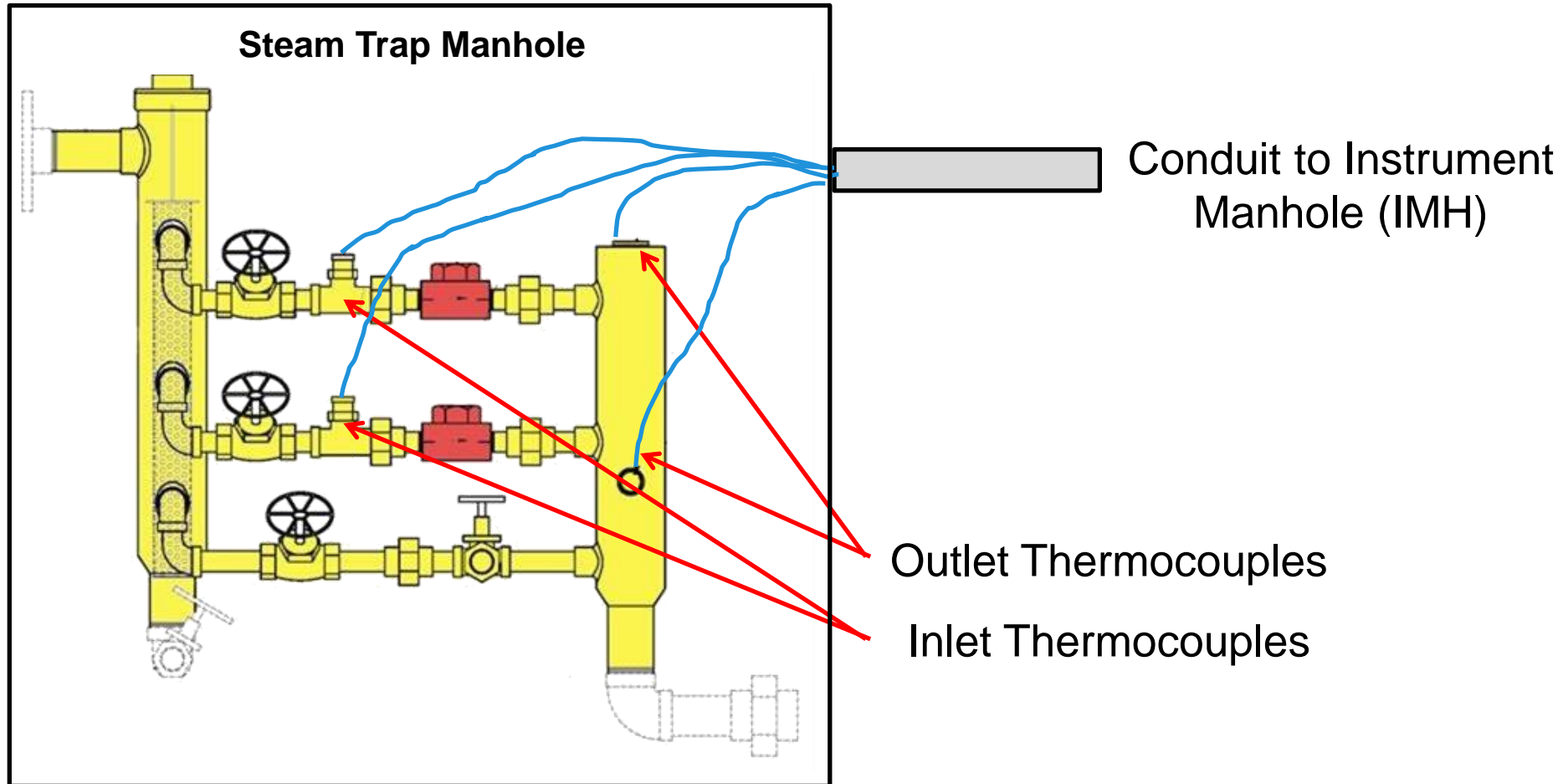
- System Expansion:
 - Total Locations: 871
 - Water Level: 757
 - Trap Monitors: 747



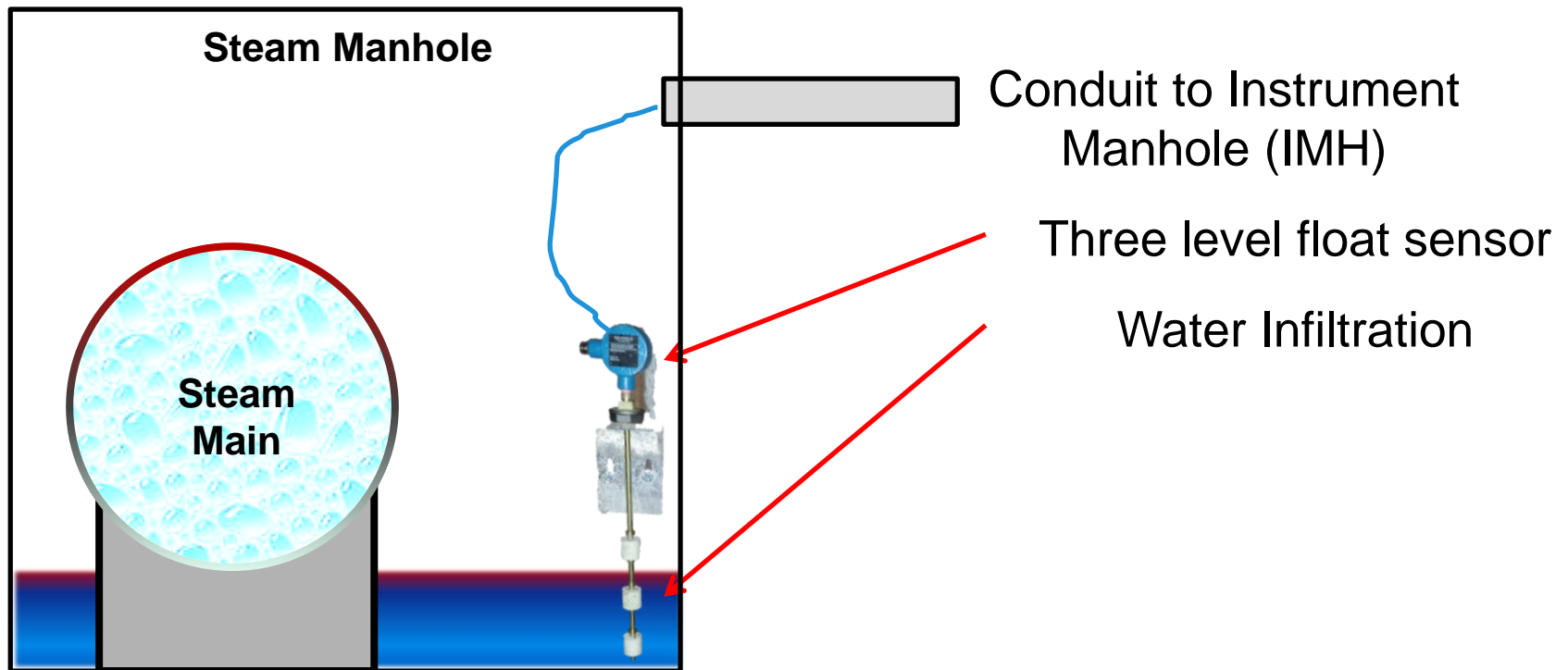
Remote Monitoring System: Overview



Remote Monitoring System: Trap Manhole



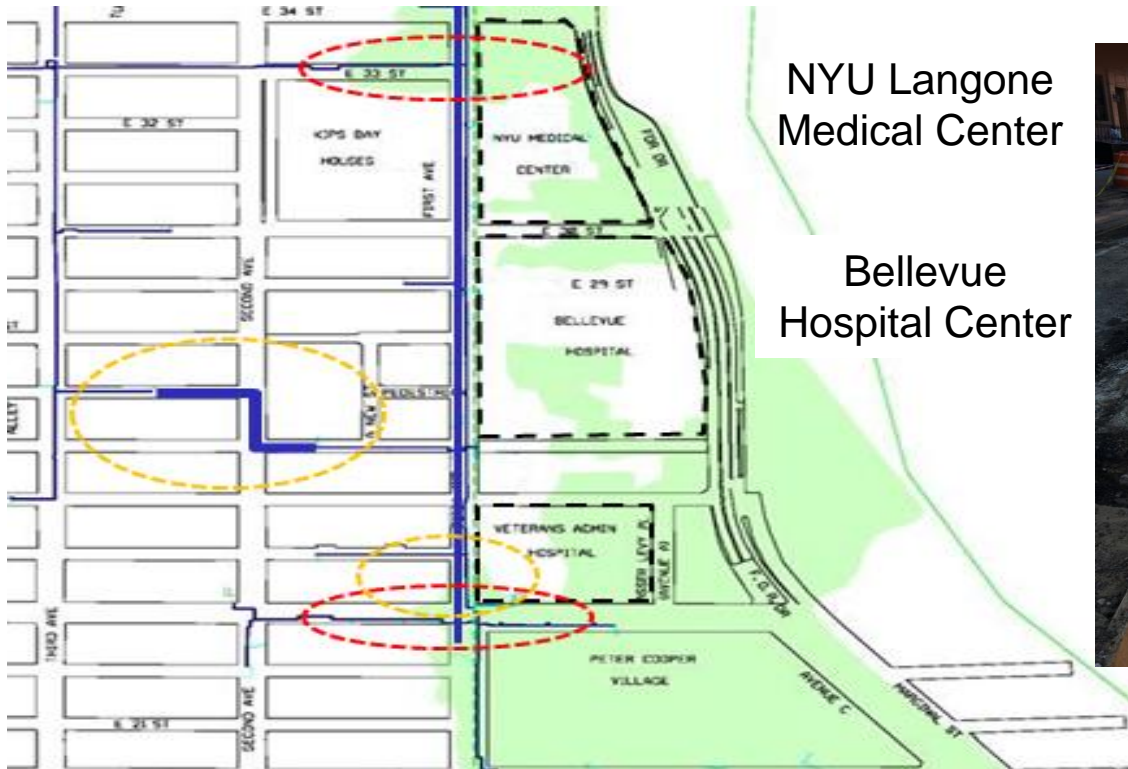
Remote Monitoring System: Steam Manhole



Remote Monitoring System: Dispatch

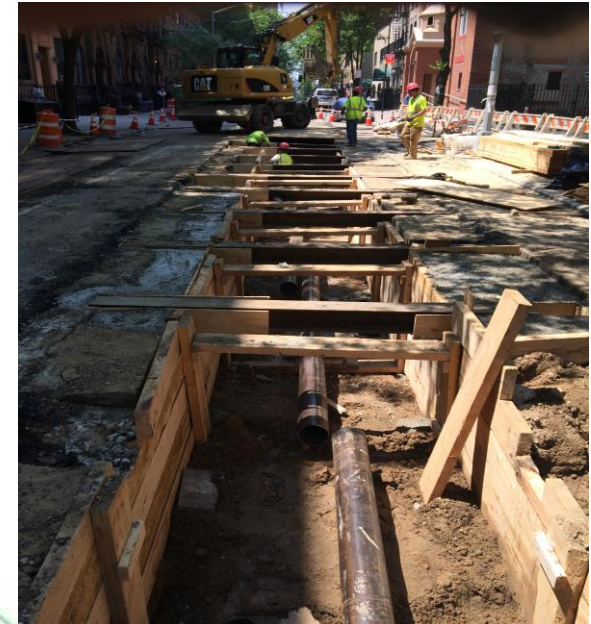


Public Health Corridor: New Main Interconnect



NYU Langone
Medical Center

Bellevue
Hospital Center



Distribution / Transmission Jumper: New Main Interconnect



- Enables the Company to keep the steam mains energized from the east side of lower midtown south to the west side of lower Manhattan



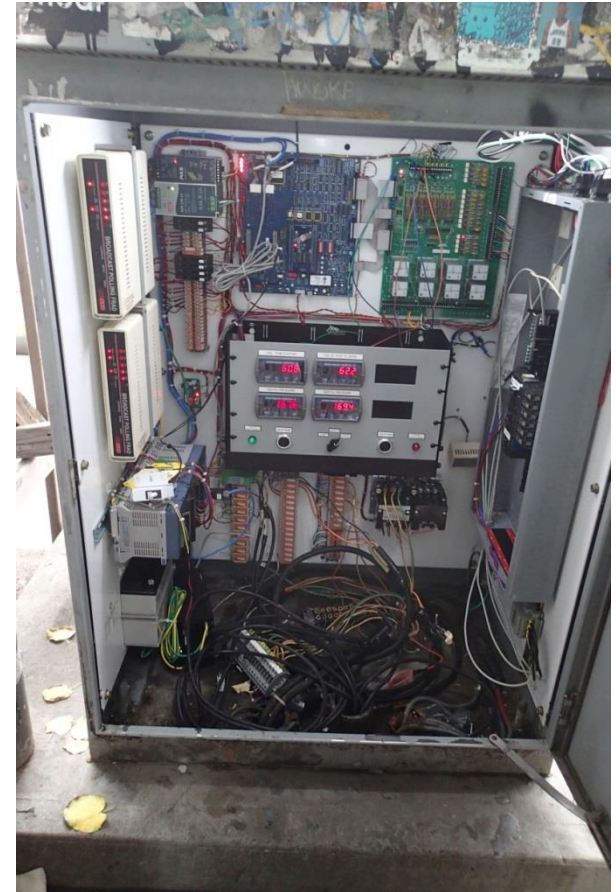
Additional Isolation Valves: Increased Sectionalizing Options

- Reduces size of outage areas
- Delivers steam right to the edge of the potential flood zones



Remote Operated Valves

- Flexibility
- Safety





Questions?